

INTELLECTUAL MODELING OF POPULATION EMPLOYMENT IN THE LABOR MARKET

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ABSTRACT

The article proposes and substantiates an improved method of intellectual analysis based on existing approaches in creation of single population database of the Republic and in coordination of the labor market. Based on the proposed method, a model of organizing an intellectual system that coordinates employment relations was created.

KEYWORDS: *Employment, Predictive Analysis, Information System, Self-Organization & Intellectual Modeling*

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INTRODUCTION

Today, the basis of the radical reforms being carried out in our country is aimed at glorifying human dignity, and through them the conditions are being created to improve the living standards of every person as well as to use modern social services. The existence of a labor market is an important factor in ensuring the development of the economy. A number of practical measures are being taken to ensure the effective use of human resources in the Republic of Uzbekistan, as a result of which each staff is provided with the necessary work in their specialty. But the development and implementation of artificial intelligence systems of such processes will achieve the intended goal quickly and transparently by creating new, fast and human-friendly information systems.

THE MAIN RESULTS AND FINDINGS

It is obvious that it is expedient to consider the tasks of providing the labor market with specialists in conjunction with the improvement of the market of educational services, because the acquisition of labor skills through general, special, higher education systems, vocational training, natural population growth, as well as the development of labor skills - is an important stage in the formation of labor resources [2].

The analysis and generalization of the research conducted on the methods of predictive analysis of the labor market allows us to distinguish several methodological approaches. [5]. Based on existing approaches, we propose an improved approach to labor market coordination (Figure 1).

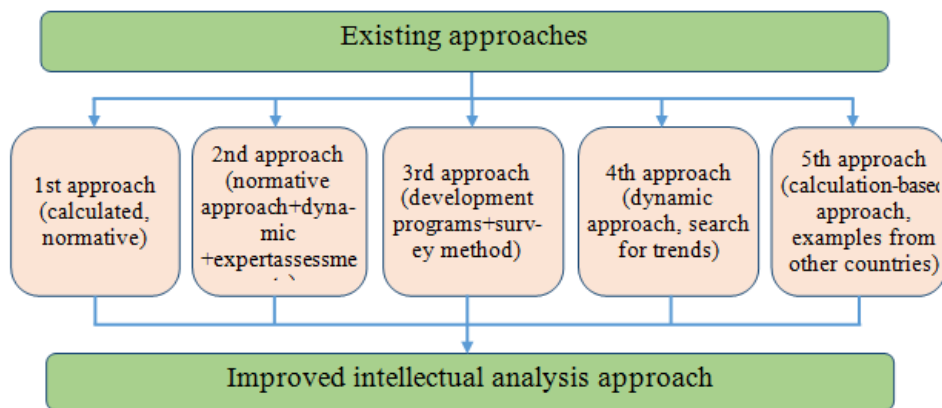


Figure 1: Improved Intellectual Analysis Approach based on Existing Approaches to Labor Market Coordination.

The above approaches are detailed in the literature and we will not dwell on these approaches [1].

The Proposed Improved Approach (Intellectual + Analytical)

The proposed approach is based on the above approaches to the intellectual analysis of labor relations of the population through automated systems. Wherein, an information system for real-time monitoring of employment will be developed and modules of intellectual analysis will be included in the information system. The proposed approach performs the following tasks:

- The employment status of the population by regions will be determined.
- Real-time employment status will be monitored in the information system.
- Based on the results of the monitoring recommendations will be made on improving the employment situation of the population.

Recommendations for improving the employment situation of the population are based on predictive-based intellectual models.

Imitation Modeling of the Labor Market

Imitation modeling allows mathematical methods to be combined with the practical and theoretical experience of practitioners. Imitation (computer) modeling of economic processes is used to manage complex business processes, to experiment with discrete-continuous models of complex economic objects, to obtain and monitor the dynamics of the managed economic object in risk-related emergencies [3].

For this reason, in this study, imitation modeling of the labor market is considered as one of the main tools to determine the essence of the relationship between workers and employers.

In the model, the change in the number of workers in the field is represented as follows.

$$dN_1(t) = (N_2(t)W_1(t) - N_1(t)W_2(t))dt, \quad (1.4.1)$$

here $N_1(t)$ – the total number of professionals currently employed in the field; $N_2(t)$ – the number of workers

who may be recruited to work in the field and are currently unemployed; $N' = N_1(t) + N_2(t) = \text{const}$ - the size of the labor market in the field; $W_1(t)dt$ is the probability that an unemployed specialist will find a job in the specialty from t to $t + dt$ time; $W_2(t)dt$ is the probability of dismissal of a specialist working from t to $t + dt$.

The development of the model was based on the assumption that there are opportunities to employ all unemployed workers in the field. Under constant conditions, the probabilities of $W_1(t)$ and $W_2(t)$, depend on time, because values $N_1(t)$ and $N_2(t)$ change over time, that is $W_1(t) = W_1(N_1(t), N_2(t))$ and $W_2(t) = W_2(N_1(t), N_2(t))$. The probability of finding a job depends, first of all, on the availability of jobs, hence $W_1(t) = W_1(N_2(t))$.

We extend the functions $W_1(N_2)$ and $W_2(N_1, N_2)$ on the appropriate arguments as follows:

$$W_1 \approx k_1 N_2(t) = k_1 (N - N_1(t));$$

$$W_2 \approx k_2 N_1(t) + k_3 N_2(t) = k_2 N_1(t) + k_3 (N - N_1(t)),$$

Here $k_i (i = 1, 2, 3)$ - coefficients that are not directly time-dependent.

Then the equation (1.4.1) is written as follows [5]:

$$\frac{dN_1(t)}{dt} = k_1 (N - N_1(t))^2 - k_2 N^2(t) - k_3 (N - N_1(t)) N_1(t). \quad (1.4.2)$$

If we define the equation (1.4.2) as $x(t) = N_1(t)/N$ by dividing (1.4.2) to N and introduce new coefficients, then the equation (1.4.2) takes the following form:

$$\frac{dx(t)}{dt} = (v_1 + v_3 - v_2)x^2(t) - (2v_1 + v_3)x(t) + v_1. \quad (1.4.3)$$

To find the stationary points of the equation (1.4.3) we assume that $\frac{dx(t)}{dt} = 0$. The sought stationary points are in the form of the following solutions of the equation [4].

$$x_1 = \frac{2v_1 + v_3 - \sqrt{v_3^2 + 4v_1v_2}}{2(v_1 + v_3 - v_2)} \text{ ba } x_2 = \frac{2v_1 + v_3 + \sqrt{v_3^2 + 4v_1v_2}}{2(v_1 + v_3 - v_2)}.$$

The exact solution of the (1.4.3) equation is represented by stationary solutions:

$$x(t) = x_2 + \frac{x_2 - x_1}{\frac{x_1 - x_0}{x_2 - x_0} \exp(-\alpha t) - 1}, \quad (1.4.4)$$

Here $\alpha = \sqrt{v_3^2 + 4v_1v_2}$, x_0 - employment rate at the initial state of time.

Based on this, the solution of the problem of coordination of employment in the labor market was chosen on the basis of digital technologies and intellectual models and algorithms. The following steps are performed in the implementation of the tasks. Based on the modeling of employment in the labor market, a functional model of coordination of labor relations was developed in the form of Figure 2.

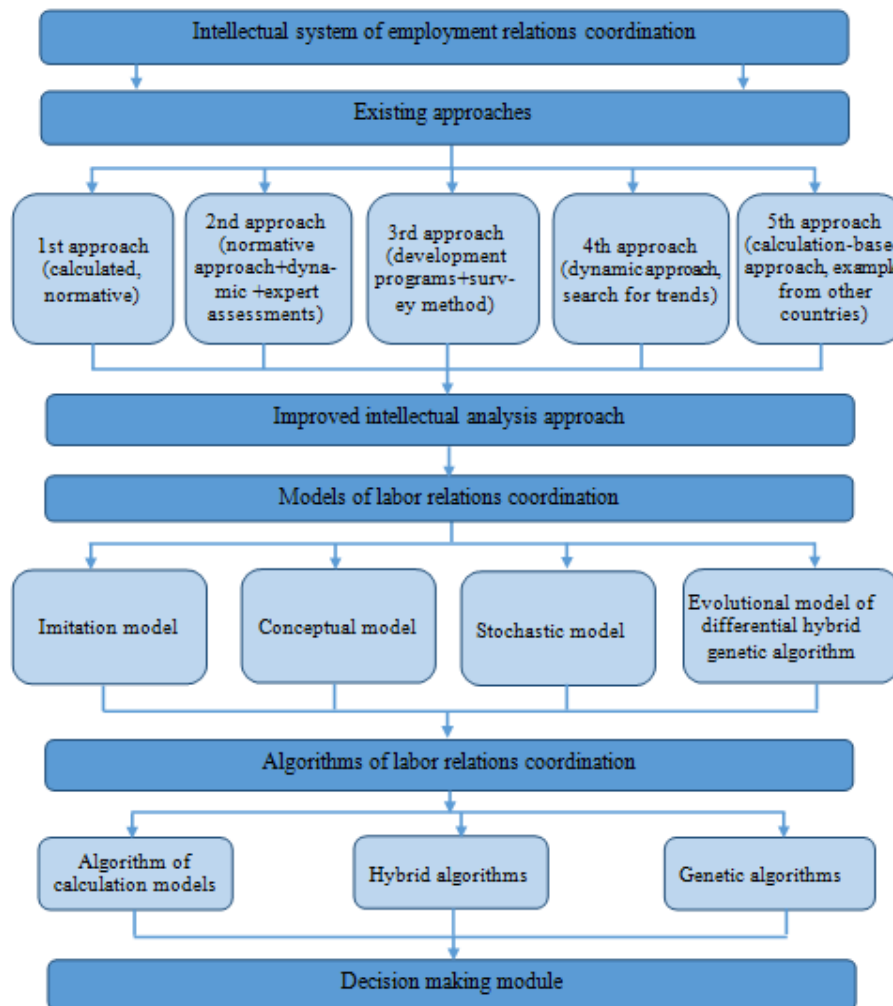


Figure 2: Functional Model of Labor Relations Coordination based on Modeling of Population Employment in the Labor Market.

The stages of the research will be carried out on the basis of a functional model of labor relations coordination based on the modeling of population employment in the labor market [6].

CONCLUSIONS

An improved intellectual analysis approach in coordinating the labor market of the population has been proposed and justified. Based on this approach, a scheme for the organization of an intellectual system that coordinates employment relations was created. In the next stage of the research, an intellectual management system based on artificial intelligence of the labor market will be created and introduced.

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